

REMARKS

Claims 1, 3-34 are pending in the present application. Claims 1, 3-26 have been amended. Support for these claims can be found generally throughout the specification, and in particular on pages 2-13 and 20-27. New Claims 33-34 have been added. Support for these claims can be found on pages 9-10 of the specification. No new subject matter has been added by the amendments or the additional claims. Based on the following remarks, Applicants respectfully request allowance of the pending claims.

Rejection of Claims 1, 3-32 under 35 USC § 112

The Examiner rejected Claims 1 and 3-32 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner submitted that the recited "graft copolymer of poly(ethylene oxide)" in Claims 1, 13 and 24 constituted indefinite subject matter as to the metes and bounds, to engender an indeterminacy in scope. The Examiner also submitted that the recited "graft copolymer of poly(ethylene oxide) comprises poly(ethylene oxide) and at least one vinyl monomer" in Claim 3, and the similar recitals in Claims 4-5, 7-8, 14-19 and 25-26, constituted indefinite subject since: a) the graft copolymer as recited was repugnant to the norm, and b) it was not known by any rules of Chemistry how said "copolymer" can comprise a "monomer" vs. "monomer unit."

The Examiner submitted that the recited contents in Claims 6, 10-12 and 21-23, constituted indefinite subject matter since the basis for each claim, i.e., total composition, melt blend, etc., was not readily ascertainable. The Examiner submitted that the recite "polar vinyl polymer" in Claim 6 was recited in duplicate. The Examiner also submitted that the recited "derivatives or analogs of poly(ethylene glycol) methacrylate" in Claim 7, and the recited "derivatives and analogs" in Claim 26, constituted indefinite subject matter as to the metes and bounds of such derivatives and analogs, and engender an indeterminacy in scope.

The Examiner submitted that the recited "compatible blend" in Claim 12 constituted indefinite subject matter since it was not readily ascertainable as to what component(s) was being qualified. The Examiner also submitted that the recited "copolymer of a homopolymer of

poly(ethylene oxide) and at least one polar vinyl monomer” in Claim 15 engendered an ambiguity.

The Examiner submitted that the recited “vinyl monomer selected from” in Claim 16, and “a monomer selected from” in Claims 17 and 26, constituted indefinite subject matter because of the use of improper Markush terminology. The Examiner also submitted that the recited “one polar, vinyl monomer” in Claim 25 constituted indefinite subject matter since it was not readily ascertainable if applicant intended “one polar monomer” and “one vinyl monomer,” or “one vinyl monomer that is polar.” Applicants respectfully traverse these claim rejections for the following reasons.

Applicants have amended Claims 1, 13 and 24 to more accurately define the scope of these claims. Applicants have amended Claims 3-5, 7-8, 14-19 and 25-26 to more accurately define the composition of the graft copolymer. Applicants have also amended Claims 6, 10-12 and 21-23 to recite the basis for the listed weight percentages in each claim. Applicants have amended Claim 6 to remove the duplication. Applicants have amended Claims 7 and 26 to more accurately define these claims. Applicants have also amended Claim 12 to more accurately define the compatible blend, and to recite the basis for the listed weight percentages. Applicants have amended Claim 15 to remove the ambiguity in this claim. Applicants have amended Claim 16 to recite the proper Markush terminology, and Applicants have amended Claim 26 to remove any indications of Markush terminology. Applicants respectfully submit that Claim 17 did not previously recite Markush terminology. Applicants have also amended Claim 25 to remove the ambiguity in this claim. Applicants respectfully request that the above amendments now render the Examiner’s rejection of the respective claims moot. Therefore, Applicants respectfully request the withdrawal of this § 112 rejection.

Rejection of Claims 1, 3-32 under 35 USC § 103(a)

The Examiner rejected Claims 1 and 3-32 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 4,140,668 to Sumi *et al.* (hereinafter Sumi) or U.S. Patent 5,430,090 to Miyamoto *et al.* (hereinafter Miyamoto), in combination with U.S. Patent 3,891,584 to Ray-Chaudhuri *et al.* (hereinafter Ray-Chaudhuri).

The Examiner submitted that Sumi and Miyamoto disclose hot melt adhesive compositions, suitable for paper making such as bookbinding, wherein said compositions are defined basically as containing a polyvinyl alcohol-governed melt mixture. The Examiner submitted that both the Sumi the Miyamoto disclosures differ basically from the claimed invention in the non-express guidelines to incorporate, into the hot melt adhesive compositions, a graft copolymer of poly(ethylene oxide), as claimed in Applicants' invention.

The Examiner submitted that Ray-Chaudhuri teaches hot melt adhesive compositions, useful in bookbinding, that are defined basically as containing a graft copolymer of a poly(ethylene oxide)-governed melt mixture. The Examiner concluded it would have been obvious to the skilled artisan, to add the graft copolymer of poly(ethylene oxide) of Ray-Chaudhuri to the polyvinyl alcohol-governed melt mixture of Sumi or Miyamoto, with a reasonable expectation of obtaining a cumulative, additive effect. The Examiner stated that "[i]t is well established that no patentable invention resides in combining old ingredients of known properties." The Examiner stated that "[t]he combination of two compositions, each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition that is used for the very same purpose is prima facie obvious as authorized by *In re Kerkhoven* (205 U.S.P.Q. 1069, C.C.P.A. 1980)." Applicants respectfully traverse this rejection for the following reasons.

To establish a prima facie case of obviousness, the Examiner must establish that a prior art reference, or combined references, teach or suggest all the claim limitations of Applicants' invention. MPEP §§ 2142-2143. Also, the teaching or suggestion to make the claimed combination, and the reasonable expectation of success, must be found in the prior art, and not based on Applicant's disclosure. See MPEP § 2142; *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Applicants respectfully submit that neither the Sumi reference in combination with the Ray-Chaudhuri reference, nor the Miyamoto reference in combination with the Ray-Chaudhuri reference teach or suggest currently pending Claims 1, 3-32.

Currently pending Claim 1 is directed to a compatible blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide), the blend having improved melt processability and mechanical properties without the addition of plasticizers. The graft copolymer of poly(ethylene

oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more types of monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone. These chains are bonded at one or more points along the poly(ethylene oxide) backbone. Support for Claim 1 can be found on pages 3-6, 9-13 and 23-27 of the specification.

Applicants respectfully submit that neither Ray-Chaudhuri, Sumi, Miyamoto, nor the combination of Ray-Chaudhuri with Sumi or Miyamoto, teach or suggest compatible blends of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide). Applicants also respectfully submit that neither Ray-Chaudhuri, Sumi nor Miyamoto teach or suggest compatible blends of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide), the blend having improved melt processability and mechanical properties without the addition of plasticizers.

The Sumi reference is directed to adhesives compositions comprising a partially hydrolyzed polyvinyl acetate containing 30 to 60 mol% residual acetate group. The Sumi reference teaches adhesive compositions, and does not teach or suggest compatible blends. A compatible polymeric blend comprises two or more polymeric components that generally do not segregate into separate phases.¹ The compatibility of a blend can be determined by scanning electron microscopy (SEM). Most polymer blends are not compatible.² The compatible blends

¹ Compatible and incompatible refer to the degree of intimacy of blends, which depends on the method of measurement employed in the examination. From a practical standpoint, it is most useful to refer to a polymer blend as compatible when it does not exhibit gross symptoms of polymer segregation. A blend that is heterogeneous on a macroscopic level would thus be considered incompatible. The simple observation that a blend is compatible is sufficient to establish the material as potentially useful

Daniel W. Fox and Richard B. Allen, *COMPATIBILITY*, in Encyclopedia of Polymer Science and Engineering, Jacqueline I. Krischwitz (editor), John Wiley & Sons, New York, 1985, volume 3, page 759.

² When blending two polymers of liquids, the resulting behavior falls into three categories. Either they are miscible and compatible or immiscible and incompatible, or they behave somewhere in between these two extremes.

An example of a miscible, compatible system is alcohol and water. The requirements are similar polarity and structure and the result is a single-phase mixture. With polymers, this system is rare (for example, polystyrene / polyphenylene ether...).

More common is incompatibility and immiscibility as with oil and water or polyamide and polyethylene. The materials have different polarities and structures, and the result is a two-phase mixture with poor properties, an undesirable state.

Rarer still is immiscibility and compatibility at which a mixture's constituents have different properties (e.g. structure, polarity) but show some interaction, because of reactive groups, surface active agents, or compatibilizers.

of Applicants' invention do not require a plasticizer, and are unexpected and nonobvious. The Sumi reference does not teach or suggest an adhesive composition comprising a compatible polymeric blend. In addition, the Sumi reference prefers the use of a plasticizer in the adhesive compositions containing modified poly(vinyl alcohol) that has a degree of polymerization of about 125 or greater (see Col. 6, lines 26-30).

The Miyamoto reference is directed to a polyvinyl acetate composition comprising a hydrophilic polyvinyl acetate resin that has been rendered water-soluble or water-dispersible by the partial saponification of the resin, or the introduction of hydrophilic groups into this resin. This composition, also containing a hydroxy fatty acid compound and a plasticizer, can be used as a hot-melt adhesive. The Miyamoto reference also teaches adhesives compositions, and does not teach or suggest compatible blends. In addition, the Miyamoto reference teaches the use of a plasticizer as a component of the adhesive composition (see Abstract and Col. 4, lines 34-42).

The Ray-Chaudhuri reference is directed to hot-melt adhesives comprising a graft copolymer of 40-80 wt% vinyl monomer and 20-60 wt% of a polyalkylene oxide polymer. The adhesive also contains a tackifying resin. This reference does not teach or suggest the use of poly(vinyl alcohol), nor does this reference teach or suggest compatible polymer blends. Moreover, this reference teaches the general use of a plasticizer in the adhesive compositions (see Col. 5, lines 53-58).

Applicants respectfully submit that Ray-Chaudhuri does not teach or suggest a compatible blend comprising poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide). Applicants also submit that this reference in combination with the Sumi reference, or with the Miyamoto reference, does not teach or suggest Applicants' claimed invention, since none of these references teach or suggest compatible blends, or in particular, the compatible blends of Applicants' claimed invention. Therefore, for at least the reasons given above, Applicants respectfully submit that Claims 1, and 3-32 are allowable over the art of record. Applicants submit that the Ray-Chaudhuri reference in combination with the Sumi reference or the

Examples are polymer pairs such as polyamide and poly(ethylene-co-methacrylic acid) or more often, the action of detergents to disperse an oil and water mixture.

Karlheinz Hausmann, *Polymeric Compatibilizers*, in Joseph C. Salamone (editor), Polymeric Materials Encyclopedia, CRC Press, New York, 1996, page 1364+

Response to Office Action
Inventor: Wang et al.
Application No. 09/599,079
Filed: June 19, 2000

Miyamoto reference, does not teach or suggest currently pending Claims 1, 13, and 24. Since the remaining claims depend directly or indirectly from the above respective claims, Applicants respectfully submit that the Ray-Chaudhuri reference, in combination with the Sumi reference, or the Miyamoto reference, does not teach or suggest these claims. Therefore, Applicants respectfully request the withdrawal of this rejection.

Marked up version of re-written claims

Pursuant to 37 CFR §1.121(c)(1)(ii), another version of the rewritten claims marked up to show all the changes relative to the previous version of the claims is now set forth with deleted text shown in [brackets] and added text shown in underlining:

1. (Twice Amended) A composition comprising a [melt] compatible blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide), the blend having improved melt processability and mechanical properties without the addition of plasticizers; and wherein the graft copolymer of poly(ethylene oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more types of monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone, and wherein the one or more chains are bonded at one or more points along the poly(ethylene oxide) backbone.

3. (Twice Amended) The composition of Claim 1, wherein the [graft copolymer of poly(ethylene oxide) comprises poly(ethylene oxide) and at least] one or more types of monomers comprise one or more vinyl [monomer] monomers.

4. (Twice Amended) The composition of Claim 1, wherein the [graft copolymer of poly(ethylene oxide) comprises poly(ethylene oxide) and at least] one or more types of monomers comprise one or more polar vinyl [monomer] monomers.

5. (Amended) The composition of Claim 4, wherein the [at least] one or more polar vinyl [monomer is] monomers are selected from the group consisting of 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylates, poly(ethylene glycol) ethyl ether methacrylates, poly(ethylene glycol) acrylates, poly(ethylene glycol) ethyl ether acrylate, poly(ethylene glycol) methacrylates with terminal hydroxyl groups, acrylic acid, maleic anhydride, itaconic acid, sodium acrylate, 3-hydroxypropyl methacrylate, acrylamide, glycidyl

methacrylate, 2-bromoethyl acrylate, carboxyethyl acrylate, methacrylic acid, 2-chloroacrylonitrile, 4-chlorophenyl acrylate, 2-cyanoethyl acrylate, glycidyl acrylate, 4-nitrophenyl acrylate, pentabromophenyl acrylate, poly(propylene glycol) methacrylate, poly(propylene glycol) acrylate, 2-propene-1-sulfonic acid and its sodium salt, sulfo ethyl methacrylate, 3-sulfopropyl methacrylate, and 3-sulfopropyl acrylate.

6. (Twice Amended) The composition of Claim 1, wherein the graft copolymer of poly(ethylene oxide) comprises [poly(ethylene oxide) and] from about 1 to about 30 weight percent of a polar vinyl [polymer] monomer, a polar vinyl oligomer[, a polar vinyl polymer] or a combination thereof, relative to the weight of the polyethylene oxide.

7. (Twice Amended) The composition of Claim 1, wherein the [graft copolymer of poly(ethylene oxide) comprises poly(ethylene oxide) and] one or more types of monomers comprise [2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylate or derivatives or analogs of poly(ethylene glycol) methacrylate] one or more hydroxyalkyl esters of methacrylic acid.

8. (Twice Amended) The composition of Claim 1, wherein the [graft copolymer of poly(ethylene oxide) comprises] one or more types of monomers comprise [poly(ethylene oxide) and] 2-hydroxyethyl methacrylate.

9. (Twice Amended) The composition of Claim 1, wherein the graft copolymer of poly(ethylene oxide) is [a] thermoplastic and water-soluble, and
wherein the poly(vinyl alcohol) is [a] thermoplastic and water-soluble, and
wherein the composition is thermoplastic and water-soluble without the addition of plasticizers.

10. (Twice Amended) The composition of Claim 1, wherein the [melt] compatible blend comprises, based on the total weight of the of the graft copolymer of poly(ethylene oxide) and the poly(vinyl alcohol), from about 1 weight percent to about 99 weight

percent of the graft copolymer of poly(ethylene oxide) and from about 1 weight percent to about 99 weight percent of poly(vinyl alcohol).

11. (Twice Amended) The composition of Claim 1, wherein the [melt] compatible blend comprises, based on the total weight of the of the graft copolymer of poly(ethylene oxide) and the poly(vinyl alcohol), from about 10 weight percent to about 90 weight percent of the graft copolymer of poly(ethylene oxide) and from about 10 weight percent to about 90 weight percent of poly(vinyl alcohol).

12. (Twice Amended) The composition of Claim 1, wherein the [melt] compatible blend comprises, based on the total weight of the of the graft copolymer of poly(ethylene oxide) and the poly(vinyl alcohol), from about 10 weight percent to about 50 weight percent of the graft copolymer of poly(ethylene oxide) and from about 50 weight percent to about 90 weight percent of poly(vinyl alcohol) [compatible blend].

13. (Twice Amended) A thermoplastic, water-soluble composition comprising a compatible [melt] blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide);

wherein the graft copolymer of poly(ethylene oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more types of monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone, and wherein the one or more chains are bonded at one or more points along the poly(ethylene oxide) backbone.

14. (Twice Amended) The composition of Claim 13, wherein the [graft copolymer of poly(ethylene oxide) is a copolymer of poly(ethylene oxide) and at least] one or more types of monomers comprise one or more vinyl [monomer] monomers.

15. (Twice Amended) The composition of Claim 13, wherein the [graft copolymer of poly(ethylene oxide) is a copolymer of a homopolymer of poly(ethylene oxide) and

at least] one or more types of monomers comprise one or more polar vinyl [monomer] monomers.

16. (Twice Amended) The composition of Claim 13, wherein the [graft copolymer of poly(ethylene oxide) is a copolymer of poly(ethylene oxide) and at least] one or more types of monomers comprise one or more polar vinyl [monomer] monomers selected from the group consisting of 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylates, poly(ethylene glycol) ethyl ether methacrylates, poly(ethylene glycol) acrylates, poly(ethylene glycol) ethyl ether acrylate, poly(ethylene glycol) methacrylates with terminal hydroxyl groups, acrylic acid, maleic anhydride, itaconic acid, sodium acrylate, 3-hydroxypropyl methacrylate, acrylamide, glycidyl methacrylate, 2-bromoethyl acrylate, carboxyethyl acrylate, methacrylic acid, 2-chloroacrylonitrile, 4-chlorophenyl acrylate, 2-cyanoethyl acrylate, glycidyl acrylate, 4-nitrophenyl acrylate, pentabromophenyl acrylate, poly(propylene glycol) methacrylate, poly(propylene glycol) acrylate, 2-propene-1-sulfonic acid and its sodium salt, sulfo ethyl methacrylate, 3-sulfopropyl methacrylate, and 3-sulfopropyl acrylate.

17. (Twice Amended) The composition of Claim 13, wherein the graft copolymer of poly(ethylene oxide) comprises [a copolymer of poly(ethylene oxide) and] from about 1 to about 30 weight percent of polar vinyl monomer, polar vinyl oligomer[, polar vinyl polymer] or a combination thereof, relative to the weight of the poly(ethylene oxide).

18. (Twice Amended) The composition of Claim 13, wherein the [graft copolymer of poly(ethylene oxide) comprises a copolymer of poly(ethylene oxide) and a monomer selected from 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylate and derivatives and analogs of poly(ethylene glycol) methacrylate] one or more types of monomers comprise one or more hydroxyalkyl esters of methacrylic acid.

19. (Twice Amended) The composition of Claim 13, wherein the [graft copolymer of poly(ethylene oxide) comprises a copolymer of poly(ethylene oxide) and] one or more types of monomers comprise 2-hydroxyethyl methacrylate.

20. (Twice Amended) The composition of Claim 13, wherein the graft copolymer of poly(ethylene oxide) is [a] thermoplastic and water-soluble, and wherein the poly(vinyl alcohol) is thermoplastic and water-soluble.

21. (Twice Amended) The composition of Claim 13, wherein the [melt] compatible blend comprises, based on the total weight of the of the graft copolymer of poly(ethylene oxide) and the poly(vinyl alcohol), from about 1 weight percent to about 99 weight percent of the [grafted] graft copolymer of poly(ethylene oxide) and from about 1 weight percent to about 99 weight percent of the poly(vinyl alcohol).

22. (Twice Amended) The composition of Claim 13, wherein the [melt] compatible blend comprises, based on the total weight of the of the graft copolymer of poly(ethylene oxide) and the poly(vinyl alcohol), from about 10 weight percent to about 90 weight percent of the graft copolymer of poly(ethylene oxide) and from about 10 weight percent to about 90 weight percent of the poly(vinyl alcohol).

23. (Twice Amended) The composition of Claim 13, wherein the [composition] compatible blend comprises, based on the total weight of the of the graft copolymer of poly(ethylene oxide) and the poly(vinyl alcohol), from about 10 weight percent to about 50 weight percent of the graft copolymer of poly(ethylene oxide) and from about 50 weight percent to about 90 weight percent of the poly(vinyl alcohol).

24. (Twice Amended) A thermoplastic, water-soluble composition consisting essentially of a [melt] compatible blend of a poly(vinyl alcohol) and a graft copolymer of poly(ethylene oxide);

wherein the graft copolymer of poly(ethylene oxide) comprises a poly(ethylene oxide) backbone main chain, and one or more chains derived from one or more types of monomers that differ chemically or configurationally from the poly(ethylene oxide) backbone, and wherein the one or more chains are bonded at one or more points along the poly(ethylene oxide) backbone.

25. (Twice Amended) The composition of Claim 24, wherein the [graft copolymer of poly(ethylene oxide) is a copolymer poly(ethylene oxide) and at least] one or more types of monomers comprise one or more polar[,] vinyl [monomer] monomers.

26. (Twice Amended) The composition of Claim 24, wherein the [graft copolymer of poly(ethylene oxide) comprises a copolymer of poly(ethylene oxide) and a monomer are selected from 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylate and derivatives and analogs of poly(ethylene glycol) methacrylate] one or more types of monomers comprise one or more hydroxyalkyl esters of methacrylic acid.

New Claims

33. (New) The composition of Claim 1, wherein the graft copolymer of poly(ethylene oxide) is prepared from poly(ethylene oxide) resins with molecular weights between about 100,000 g/mol to about 8,000,000 g/mol.

34. (New) The film of Claim 27, wherein the graft copolymer of poly(ethylene oxide) is prepared from poly(ethylene oxide) resins with molecular weights between about 100,000 g/mol to about 8,000,000 g/mol.

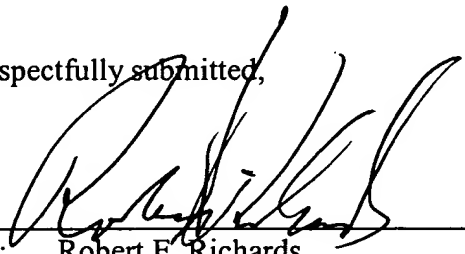
CONCLUSION

The foregoing is a complete response to the Office Action mailed May 7, 2002. Applicants respectfully submit that Claims 1 and 3-34 are patentable. Early and favorable consideration is solicited.

No additional fees are believed due; however, the Commissioner is hereby authorized to charge any deficiencies which may be required, or credit any over payment, to deposit account No. 11-0855.

If the Examiner believes that there are other issues that can be resolved by a telephone interview, or that there are any informalities that remain in the application, which may be corrected by the Examiner's amendment, a telephone call to the undersigned attorney at (404) 815-6500 is respectfully solicited.

Respectfully submitted,


By: Robert E. Richards
Reg. No. 29,105

KILPATRICK STOCKTON LLP
1100 Peachtree Street, Suite 2800
Atlanta, Georgia 30309
Tel: (404) 815-6500
Fax: (404) 815-6555
Our Docket No. 11302-0600 (44040-228250)
KC# 13,404